

CLAIMS

What is claimed is:

1. A system for regulating substrate temperature, comprising:
an exposing source operative to expose a substrate;
a temperature sensor operative to sense temperature characteristics of the substrate;
a control system operative to receive temperature information indicative of the temperature characteristics sensed by the temperature sensor, the control system being operative to control the exposing source based on the temperature information.
2. The system of claim 1, the exposing source further being operative to expose the reticle during a plurality of exposure cycles, the control system employing temperature information associated with at least one of current and previous exposure cycles to control the exposing source during a subsequent exposure cycle.
3. The system of claim 2, the control system controlling the exposing source to adjust exposure time for the subsequent exposure cycle based on the temperature information associated with the at least one of current and previous exposure cycles.
4. The system of claim 3, the control system effecting a decrease in the exposure time for the subsequent exposure cycle based on the temperature information associated with the at least one of current and previous exposure cycles indicating a temperature condition that exceeds a threshold temperature condition.
5. The system of claim 3, the control system effecting an increase in the exposure time for the subsequent exposure cycle based on the temperature information associated with the at least one of current and previous exposure cycles indicating a temperature condition below a threshold temperature condition.

6. The system of claim 3, the control system decreasing the exposure time for the subsequent exposure cycle based on the temperature information associated with the at least one of current and previous exposure cycles indicating a temperature condition exceeds a first threshold temperature condition and the control system increasing the exposure time for the subsequent exposure cycle based on the temperature information associated with the at least one of current and previous exposure cycles indicating a temperature condition below a second threshold temperature condition, which different from the first threshold temperature condition.

7. The system of claim 1, the substrate further comprising one of a reticle, a mask, and a wafer.

8. The system of claim 1, the temperature sensor further comprising a plurality of temperature sensors.

9. The system of claim 2, the plurality of temperature sensors being integrated into part of the substrate.

10. The system of claim 1, the control system being operative to determine a temperature condition for each of a plurality of zones of the substrate based on the received temperature information associated with at least one of current and previous exposure cycles.

11. The system of claim 10, the temperature condition for each of the plurality of zones including at least one of (i) an absolute temperature value equal to or derived from temperature information associated with the at least one of current and previous exposure cycles, (ii) a change in temperature value with respect to time for the at least one of current and previous exposure cycles and (iii) a moving average temperature value associated with the at least one of current and previous exposure cycles.

12. A system for regulating temperature of a reticle or mask during exposure, comprising:

an exposing source spaced apart from and oriented to emit radiation during an exposure cycle having an exposure time period;

a temperature sensor associated with the reticle or mask and operative to sense temperature of the reticle or mask and provide a temperature signal indicative thereof; and

a control system operative to discern a temperature condition of the reticle or mask based on the temperature signal, the control system storing data indicative of the temperature condition during at least some of the exposure cycles, the control system employing the stored temperature condition data and the discerned temperature condition of the reticle or mask to control the exposure time period.

13. The system of claim 12, the control system being operative to employ temperature condition data associated with at least one of current and previous exposure cycles to control the exposing source during a subsequent exposure cycle.

14. The system of claim 12, the control system being operative to at least one of (i) decrease the exposure time period if temperature condition data associated with the at least one of current and previous exposure cycles indicates a temperature condition exceeding a first threshold temperature condition and (ii) increase the exposure time period if temperature condition data associated with the at least one of current and previous exposure cycles indicates a temperature condition below a second threshold temperature condition, which is different from the first threshold temperature condition.

15. The system of claim 14, the temperature condition data further comprising at least one of (i) an absolute temperature value derived from the temperature signal received during the at least one of current and previous exposure cycles, (ii) a change in temperature with respect to time for the at least one of current and previous exposure cycles and (iii) a moving average temperature associated with the at least one of current and previous exposure cycles.

16. The system of claim 12, the control system being operative to determine a temperature condition for a plurality of different regions of the substrate based on the received temperature information associated with the at least some of the exposure cycles.

17. A system for regulating substrate temperature, comprising:

means for sensing temperature of a substrate and for providing temperature information indicative thereof;

means for exposing the substrate with radiation; and

control means for controlling operation of the means for exposing based on the temperature information provided by the means for sensing temperature.

18. The system of claim 17, further comprising means for storing temperature condition data based on the temperature information, the temperature condition data indicating temperature condition of the substrate for at least one of current and previous exposure cycles.

19. The system of claim 18, the control means further comprising means for adjusting duration of exposure provided by the means for exposing during a subsequent exposure cycle based on the temperature information associated with the at least one of current and previous exposure cycles.

20. The system of claim 19, the means for adjusting further comprising means for decreasing the duration of exposure for the subsequent exposure cycle based on the temperature condition data associated with the at least one of current and previous exposure cycles indicating a temperature condition that exceeds a threshold temperature condition.

21. The system of claim 19, the means for adjusting further comprising means for decreasing the duration of exposure for the subsequent exposure cycle based on the temperature condition data associated with the at least one of current and previous exposure cycles indicating a temperature condition below a threshold temperature condition.

22. The system of claim 17, the substrate comprising one of a reticle, a mask, and a wafer.

23. A method for regulating substrate temperature, comprising:
exposing a substrate with radiation;
sensing temperature of the substrate and providing temperature information indicative of the sensed temperature; and
controlling the exposing in a subsequent exposure cycle based on the
temperature information associated with at least one of current and previous exposure cycles.

24. The method of claim 23, further comprising adjusting exposure time for the subsequent exposure cycle based on the temperature information associated with the at least one of the current and previous exposure cycles.

25. The method of claim 24, further comprising decreasing the exposure time for the subsequent exposure cycle based on the temperature information associated with the at least one of current and previous exposure cycles relative to a threshold temperature condition.